

What is claimed is:

1. A high resolution radiation imaging storage phosphor screen, comprising:

a) a substrate having a planar surface;

b) a multiplicity of microchannels extending into the surface of the substrate, each of said microchannels having a diameter of less than 40 microns,

c) a multiplicity of storage phosphors disposed in each of said microchannels.

2. The phosphor screen as claimed in claim 1 wherein the phosphors have diameters of from about 40 to 75% of the diameter of the microchannels

3. The phosphor screen as claimed in claim 1 further including a reflective coating disposed along the walls of the microchannels.

4. The phosphor screen as claimed in claim 3 wherein said reflective coating has a reflectivity of at least 85 %.

5. The phosphor screen as claimed in claim 1, wherein the microchannels have a wall thickness of 1-12 microns.

6. The phosphor screen as claimed in claim 1, wherein the reflective coating has a thickness of less than about 50 nanometers.

7. The phosphor screen as claimed in claim 1, wherein the plate has a thickness of from about 50 microns to about 2000 microns.

8. The phosphor screen as claimed in claim 1 wherein the storage phosphor comprises BaFBr:Eu²⁺.

9. The phosphor screen as claimed in claim 1 further including refractive matching material disposed in the microchannels together with the phosphors.

10. The phosphor screen as claimed in claim 1 wherein the radiation that is to be imaged comprises X-rays.

- 5 (1) 10. A high resolution radiation imaging phosphor screen, comprising:
- a) a base substrate having a mounting surface;
 - b) a plurality of microchannel plates releasably secured to the mounting surface of the base substrate, each of said microchannel plates having a multiplicity of microchannels having a diameter of less than 40 microns, and
 - 10 c) a multiplicity of phosphors disposed in each of said microchannels.

- (2) 11. The imaging screen as claimed in claim 10 wherein the base substrate includes series of upstanding mesas, selected ones of said plurality of microchannel plates being releasably secured to said mesas others of said plurality of microchannel plates being
- 15 releasably secured to the portions of the base substrate between said mesas.

- (3) 12. The imaging screen as claimed in claim 11 wherein the edges of the microchannel plates that are releasably secured to said mesas overlap the edges of the microchannel plates releasably secured to the portions of the base substrate between said mesas.

- 20 (4) 13. The imaging screen as claimed in claim 10 wherein the phosphors disposed in each of said microchannels comprise storage phosphors.

- (5) 14. The imaging screen as claimed in claim 10 wherein the storage phosphors
- 25 disposed in each of said microchannels comprise BaFBr:Eu²⁺.

- (6) 15. The imaging screen as claimed in claim 10, wherein the microchannel plates have a thickness of from about 50 microns to about 4000 microns.